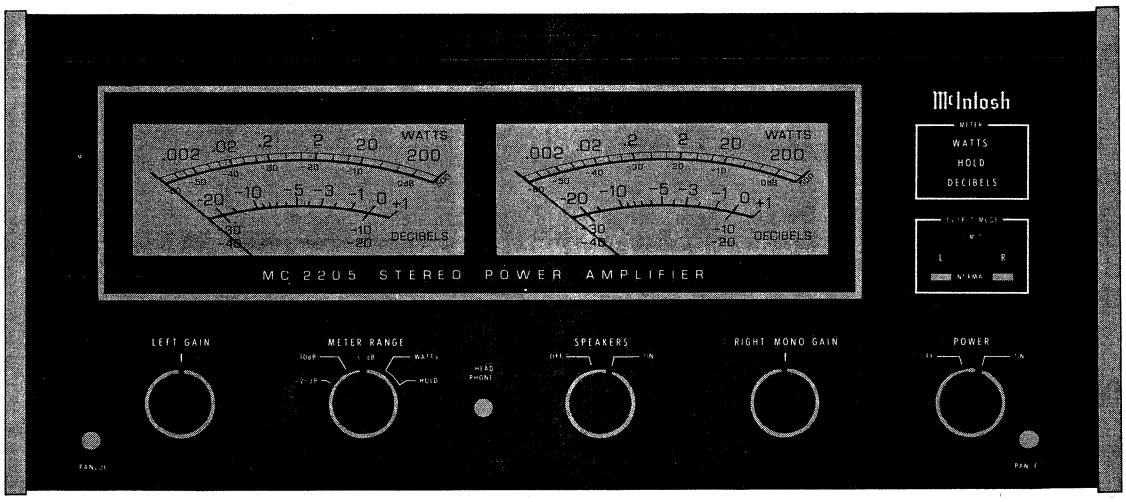
McIntosh

MC 2205

POWER AMPLIFIER



SERVICE INFORMATION

STARTING WITH SERIAL NO. AX1001

McINTOSH LABORATORY INC. BINGHAMTON, NEW YORK 13903

038-980

MC2205

PERFORMANCE LIMITS & RATINGS

PERFORMANCE

McIntosh audio power ratings are in accordance with the Federal Trade Commission Regulation of November 4, 1974 concerning power output claims for amplifiers used in home entertainment products.

POWER OUTPUT

STEREO: 200 watts minimum sine wave continuous average power output, per channel, both channels operating into 1 ohm, 2 ohms, 4 ohms, or 8 ohms load impedance, which is:
14.1 volts RMS across 1 ohm
20.0 volts RMS across 2 ohms
28.3 volts RMS across 4 ohms
40.0 volts RMS across 8 ohms

MONO: 400 watts minimum sine wave continuous average power output into 0.5 ohm, 1 ohm, 2 ohms, or 4 ohms load impedance, which is:
14.1 volts RMS across 0.5 ohm
20.0 volts RMS across 1 ohm
28.3 volts RMS across 2 ohms
40.0 volts RMS across 4 ohms

OUTPUT LOAD IMPEDANCE

STEREO: 1 ohm, 2 ohms, 4 ohms, and 8 ohms; separate terminals are provided for each output

MONO: 0.5 ohm, 1 ohm, 2 ohms, and 4 ohms; obtained by connecting together the appropriate terminals of both channels

RATED POWER BAND

20 Hz to 20,000 Hz

TOTAL HARMONIC DISTORTION

STEREO: 0.1% maximum harmonic distortion at any power level from 250 milliwatts to 200 watts per channel from 20 Hz to 20,000 Hz, both channels operating

MONO: 0.1% maximum harmonic distortion at any power level from 250 milliwatts to 400 watts from 20 Hz to 20,000 Hz

INTERMODULATION DISTORTION

STEREO: 0.1% maximum if instantaneous peak power output is 400 watts or less per channel with both channels operating for any combination of frequencies, 20 Hz to 20,000 Hz

MONO: 0.1% maximum if instantaneous peak power output is 800 watts or less for any combination of frequencies, 20 Hz to 20,000 Hz

FREQUENCY RESPONSE

(at one watt output)

20 Hz to 20,000 Hz, +0 -0.25 dB
10 Hz to 100,000 Hz +0 -3.0 dB

NOISE AND HUM

95 dB below rated output

RATINGS

OUTPUT VOLTAGES

25 volts for distribution lines

DAMPING FACTOR

STEREO: 16 at 1 ohm output, 50 at 2 ohms output, 30 at 4 ohms output, 16 at 8 ohms output

MONO: 16 at 0.5 ohms, 50 at 1 ohm, 30 at 2 ohms, and 16 at 4 ohms output

INPUT IMPEDANCE

100,000 ohms

INPUT SENSITIVITY

Switchable: 0.75 volt or 2.5 volts-Level control provided for higher input voltages

POWER REQUIREMENTS

120 volts 50/60Hz, 70 to 550 watts.

SCHEMATIC NOTES

1. Unless otherwise specified: Resistance values are in ohms, 1/4 watt, and 10% tolerance; capacitance values smaller than 1 are in microfarads (μF); capacitance values greater than 1 are in picofarads (pF); inductors are in microhenries (μH).

2. Printed circuit board components are outlined on the schematics by dotted lines. The circled numbers on the dotted lines correspond to the numbers on the PC board layouts.

3. The heavy lines on the schematics denote the primary signal path.

4. The terminal numbering of rotary switches is for reference only.

5. All voltages indicated on the schematics are measured under the following conditions:

   a. Use of an 11 megohm impedance VTVM.

   b. All voltages ± 10% with respect to chassis ground.

   c. No signal at input terminals.

   d. AC input at 120 volts AC, 50/60Hz.

   e. Front panel controls at:

Left Gain	FULLY CCW
Meter Range	WATTS
Right/Mono Gain	FULLY CCW
Speakers	ON
Power	ON

   Rear panel switches at:

Input Level	0.75V
Mode	Stereo
Power Guard	Normal

6. Relay K301 shown in energized position.

7. Meter adjustments:

   Amplifier must be working properly to adjust meters. Operate amplifier at full power (40V rms) into 8 ohm loads with 1KHz input signal.

   a. Set METER RANGE switch to WATTS.

   b. Adjust potentiometer R125 on meter board for a reading of 200 watts on the left meter.

   c. Adjust R126 for a reading of 200 watts on the right meter.

   d. Set METER RANGE switch to 0 dB

   e. Adjust potentiometer R105 on meter board for a reading of 0 on the DECIBEL scale of the left meter.

   f. Adjust R106 for a reading of 0 on the right meter.

8. Power amplifier bias adjustment:

   Operate MC 2205 at 120 volts line input with no input signal. Measure the input power (approximately 50 watts) or current (approximately 0.4 amps). The bias potentiometers R241 & R242 are located on the power output PC boards.

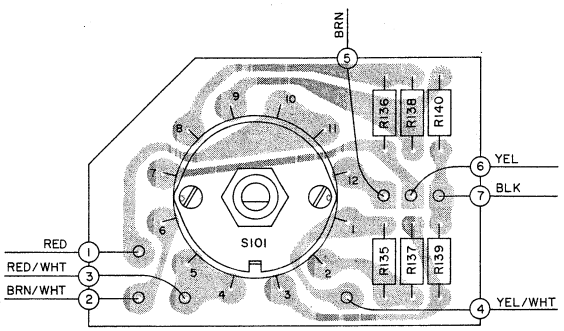
   a. Turn both bias potentiometers full ccw

   b. Rotate bias adjustment cw to the point where the line input power or current begins to increase then back off slightly to the point where the line input reaches its lowest value.

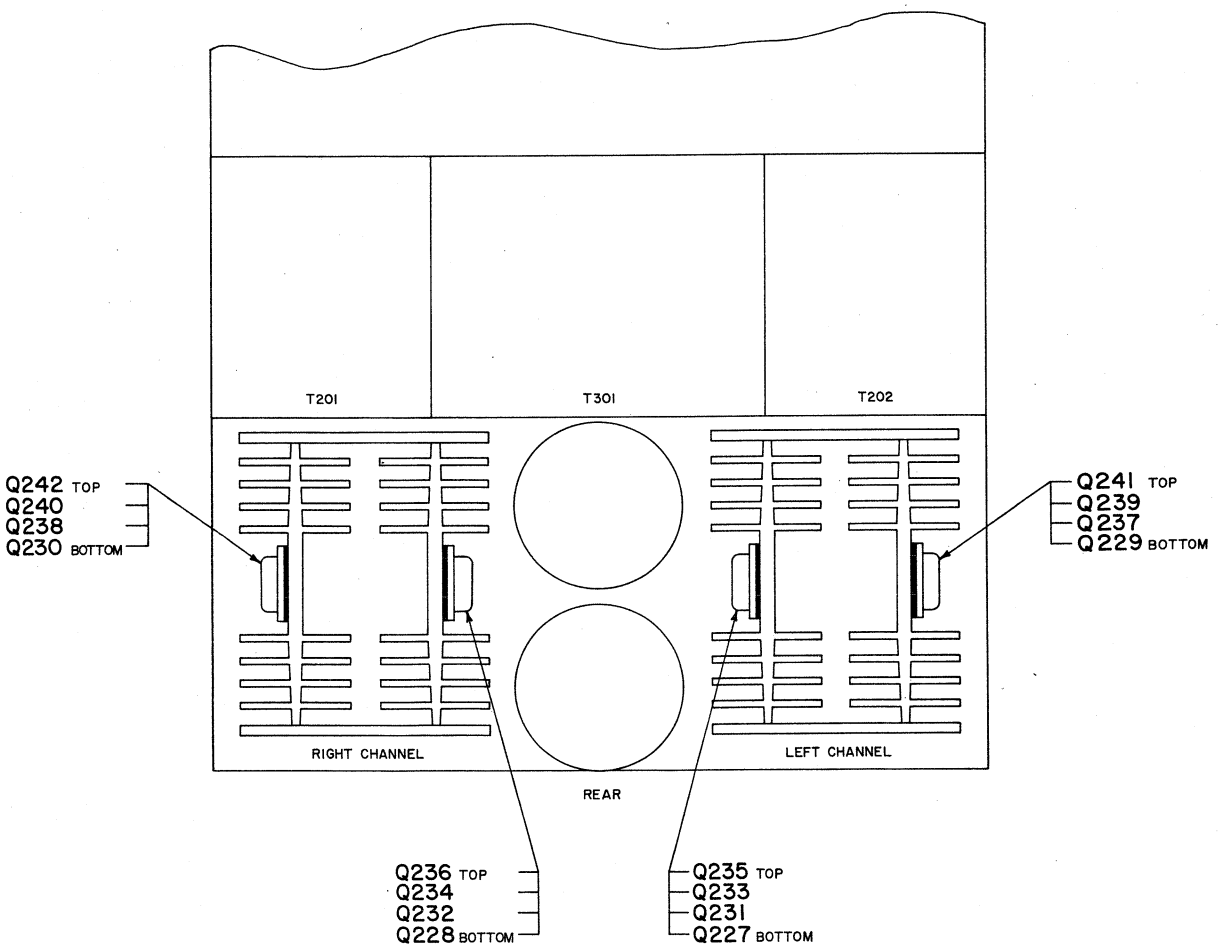
   c. Repeat step b for each channel independently.

9. In units with Serial No's below AV1520 C241 is a 47pF and a 33pF capacitor in parallel. C 242 is two 47pF capacitors in parallel.

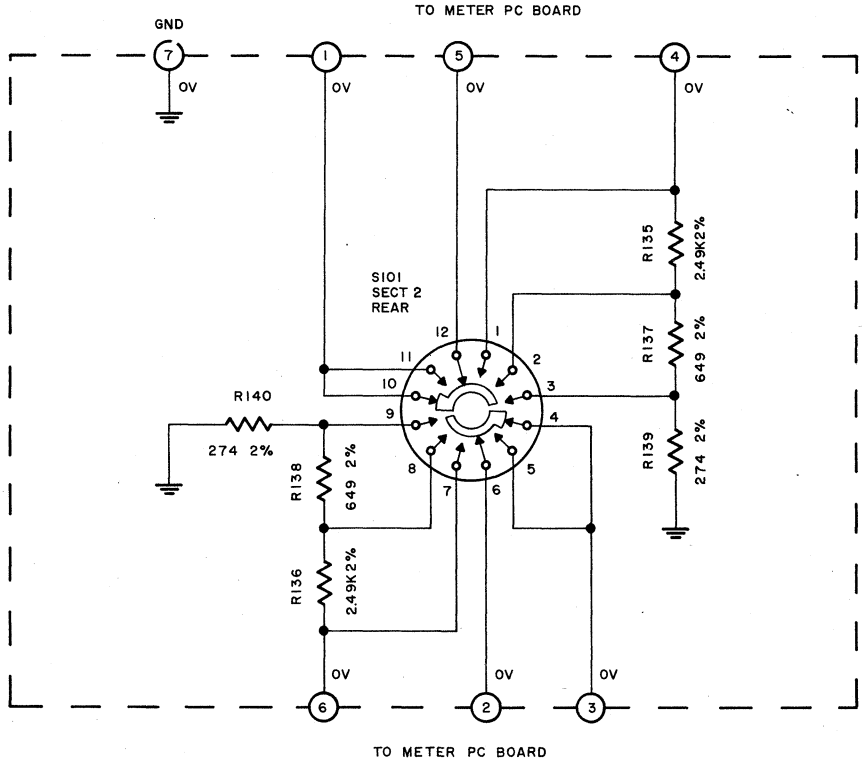
AC2205



METER RANGE PC BOARD 044-623

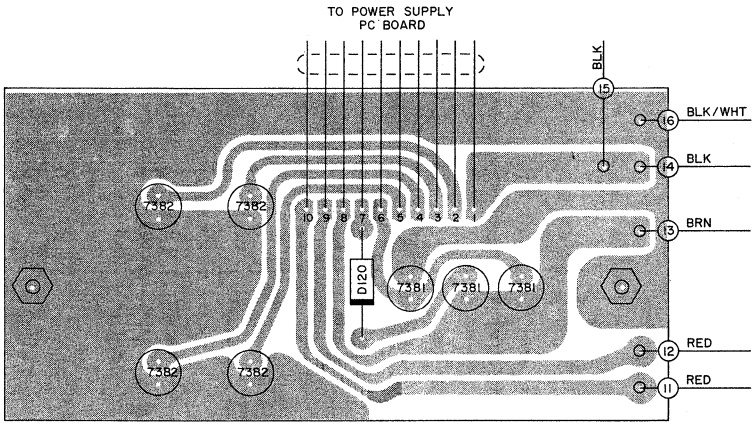


LOCATION OF TRANSISTORS NOT ON PC BOARD

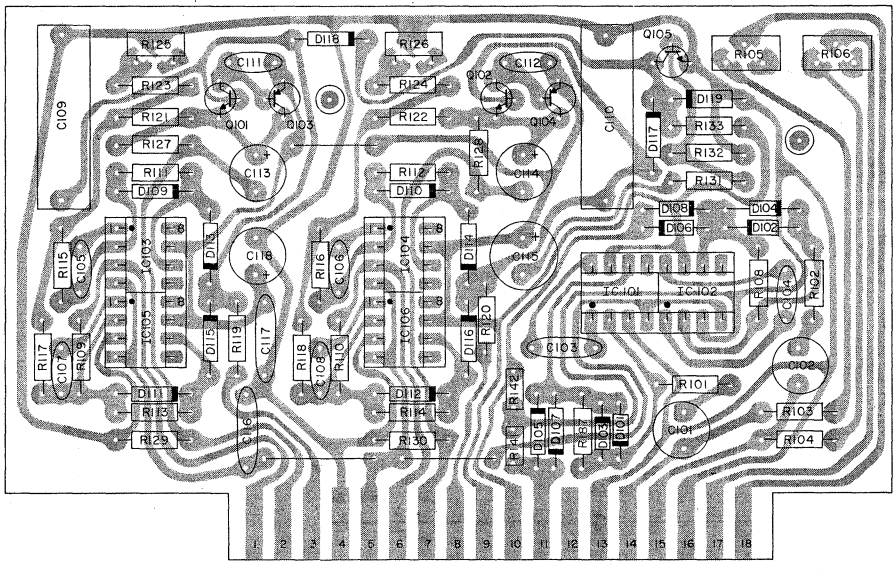


METER RANGE PC BOARD 044-623

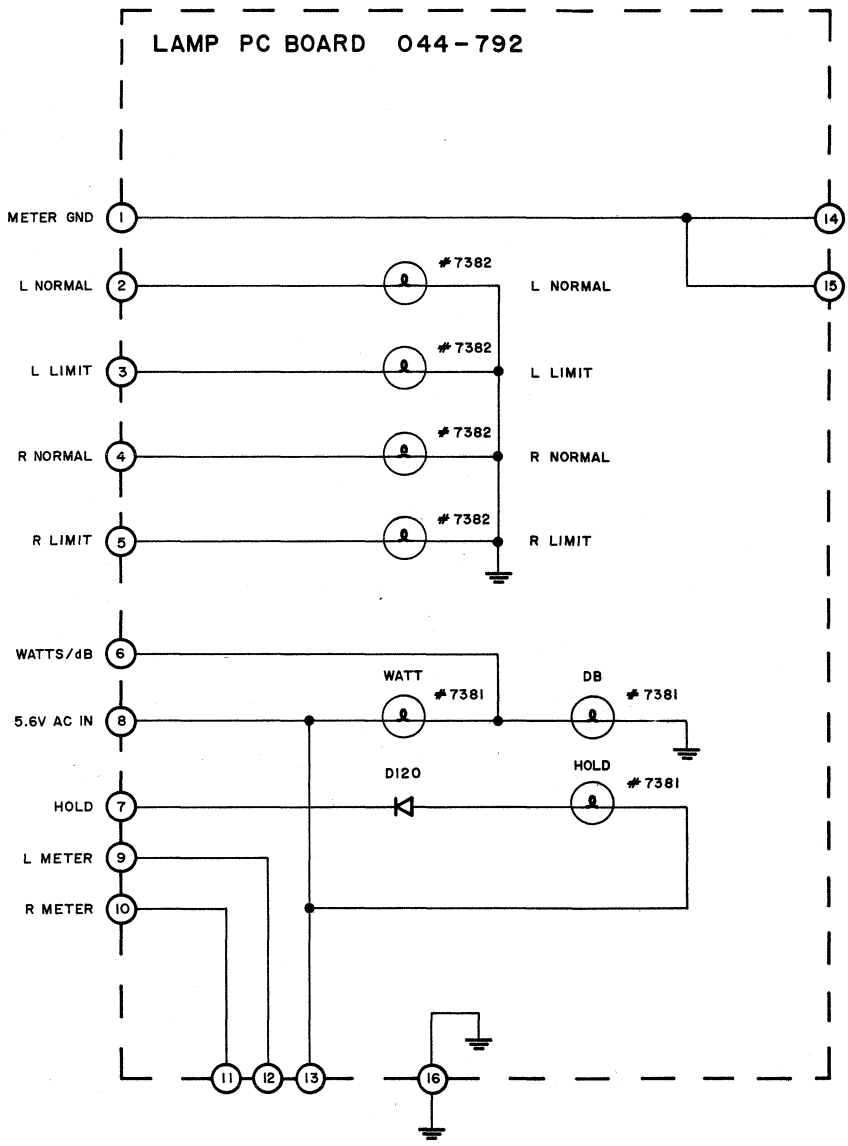
SWITCH IS SHOWN FRONT VIEW
IN WATTS POSITION

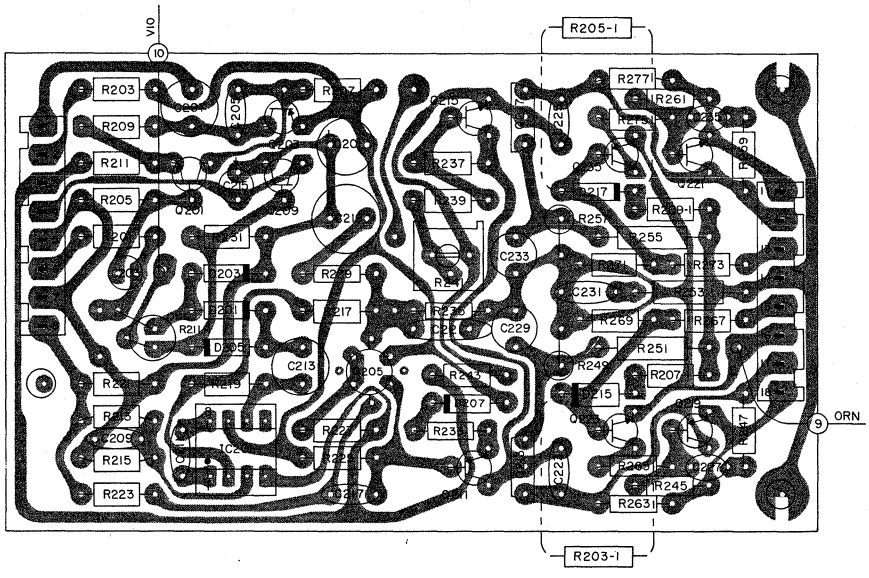


LAMP PC BOARD 044-792

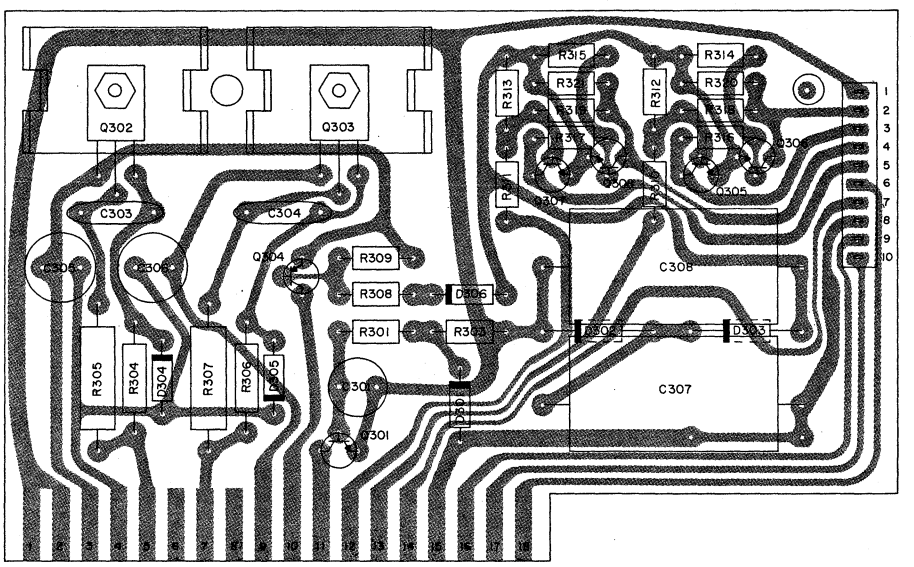


METER PC BOARD 044-624


LAMP PC BOARD 044-792
METER GND
1
14
L NORMAL
2
#7382
L NORMAL
15
L LIMIT
3
#7382
L LIMIT
R NORMAL
4
#7382
R NORMAL
R LIMIT
5
#7382
R LIMIT
WATTS/dB
6
WATT
#7381
DB
#7381
5.6V AC IN
8
D120
HOLD
#7381
HOLD
7
L METER
9
R METER
10
11
12
13
16



LEFT CHANNEL POWER OUTPUT PC BOARD 044-626



POWER SUPPLY PC BOARD 044-631

REPLACEMENT PARTS

All parts not listed are common items obtainable from radio parts jobbers.

Replacement parts may be obtained when ordered by PART NUMBER from:

McIntosh Laboratory, Inc.
Customer Service Department
2 Chambers Street
Binghamton, New York 13903
(telephone 607-723-3512)

CAPACITORS

Symbol Number	Description			Part Number
C101,102	Elect	10µF	35V	066-173
C109,110	Mylar	1.5µF	100V	064-143
C113,114	Elect	10µF	50V	066-221
C115	Elect	22µF	35V	066-214
C118	Elect	47µF	16V	066-182
C201,202	Elect	10µF	50V	066-221
C203,204	Elect	.47µF	50V	066-244
C207,208	Elect	10µF	35V	066-173
C213,214	Elect	10µF	35V	066-173
C215,216	Elect	.47µF	50V	066-244
C219,220	Elect	220µF	16V	066-218
C227,228	Mylar	.0047µF	100V	064-132
C229,230	Poly	.01µF 2.5%	63V	064-142
C231,232	Mylar	.068µF	100V	064-136
C233,234	Poly	.01µF 2.5%	63V	064-142
C235,236	Mylar	.0047µF	100V	064-132
C239,240	Elect	1µF	63V	066-248
C301	Elect	10µF	50V	066-221
C305,306	Elect	100µF	16V	066-226
C307,308	Elect	2200µF	16V	066-247
C309	Mylar	.22µF	400V	064-267
C310,311	Elect	39000µF	50V	066-225

DIODES

D101,102	Si. signal diode		070-096
D103,104	Si. signal diode		070-096
D105,106	Si. signal diode		070-096
D107,108	Si. signal diode		070-096
D109,110	Si. signal diode		070-047
D111,112	Si. signal diode		070-047
D113,114	Si. signal diode		070-047
D115,116	Si. signal diode		070-047
D117,118	Si. signal diode		070-047
D119	Zener diode		070-085
D120	Si. rectifier		070-031
D201,202	Si. signal diode		070-047
D203,204	Si. signal diode		070-047
D205,206	Si. signal diode		070-047
D207,208	Si. signal diode		070-047
D209,210	Si. rectifier		070-031
D211,212	Si. rectifier		070-031
D213,214	Si. rectifier		070-031
D215,216	Si. signal diode		070-047
D217,218	Si. signal diode		070-047
D301	Si. signal diode		070-047
D302,303	Si. signal diode		070-031
D304,305	Zener diode	16V	070-089
D306	Zener diode	16V	070-089
D307	Rectifier bridge		070-050
D308	Si. rectifier		070-031

FUSES

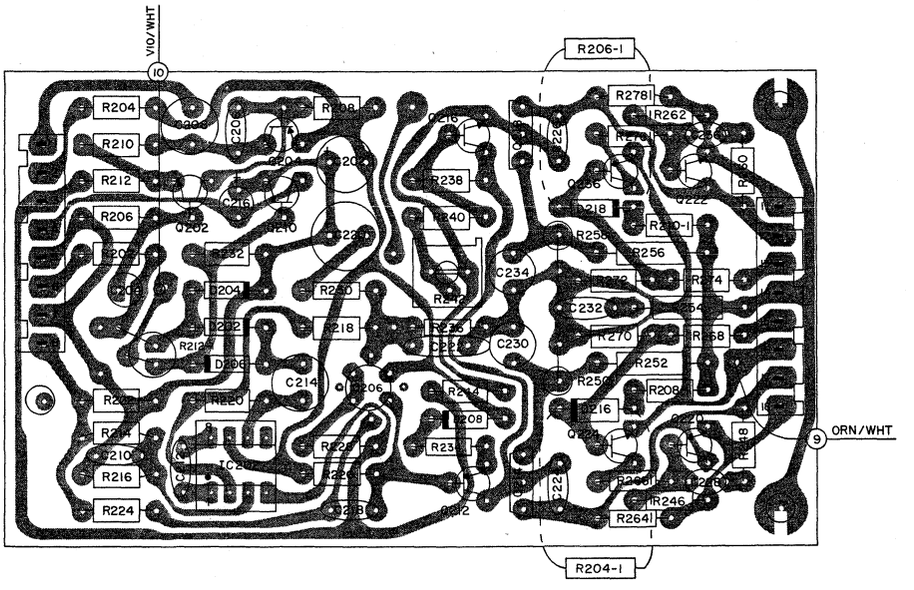
F301	Fuse	10A	089-034

METERS

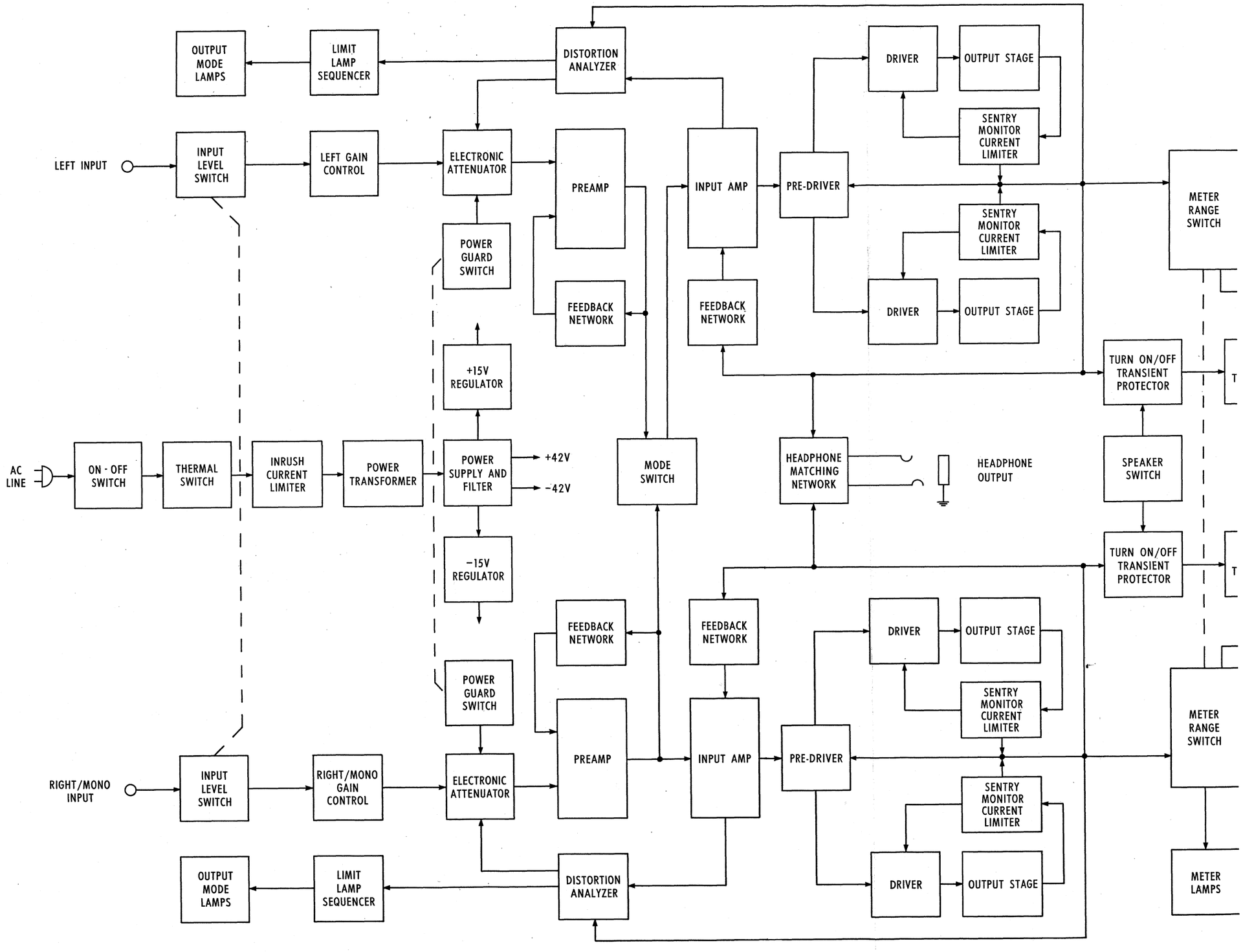
M101,102	Meter (power level)		124-026

TRANSISTORS

Q101,102	Si. NPN transistor		132-092
Q103,104	Si. PNP transistor		132-096
Q105	Si. NPN transistor		132-092
Q201,202	Si. NPN transistor		132-093
Q203,204	Si. PNP transistor		132-096
Q205,206	Dual NPN transistor		132-155
Q209,210	Si. PNP transistor		132-096
Q211,212	Si. PNP transistor		132-096
Q213,214	Si. NPN transistor		132-149
Q215,216	Si. NPN transistor		132-093
Q217,218	Si. PNP transistor		132-148
Q219,220	Si. PNP transistor		132-150
Q221,222	Si. NPN transistor		132-143
Q223,224	Si. NPN transistor		132-136
Q225,226	Si. PNP transistor		132-147
Q227,228	Si. PNP transistor		132-151
Q229,230	Si. NPN transistor		132-152
Q231,232	Si. NPN transistor		132-164
Q233,234	Si. NPN transistor		132-164
Q235,236	Si. NPN transistor		132-164
Q237,238	Si. PNP transistor		132-165
Q239,240	Si. PNP transistor		132-165



RIGHT CHANNEL POWER OUTPUT PC BOARD 044-626

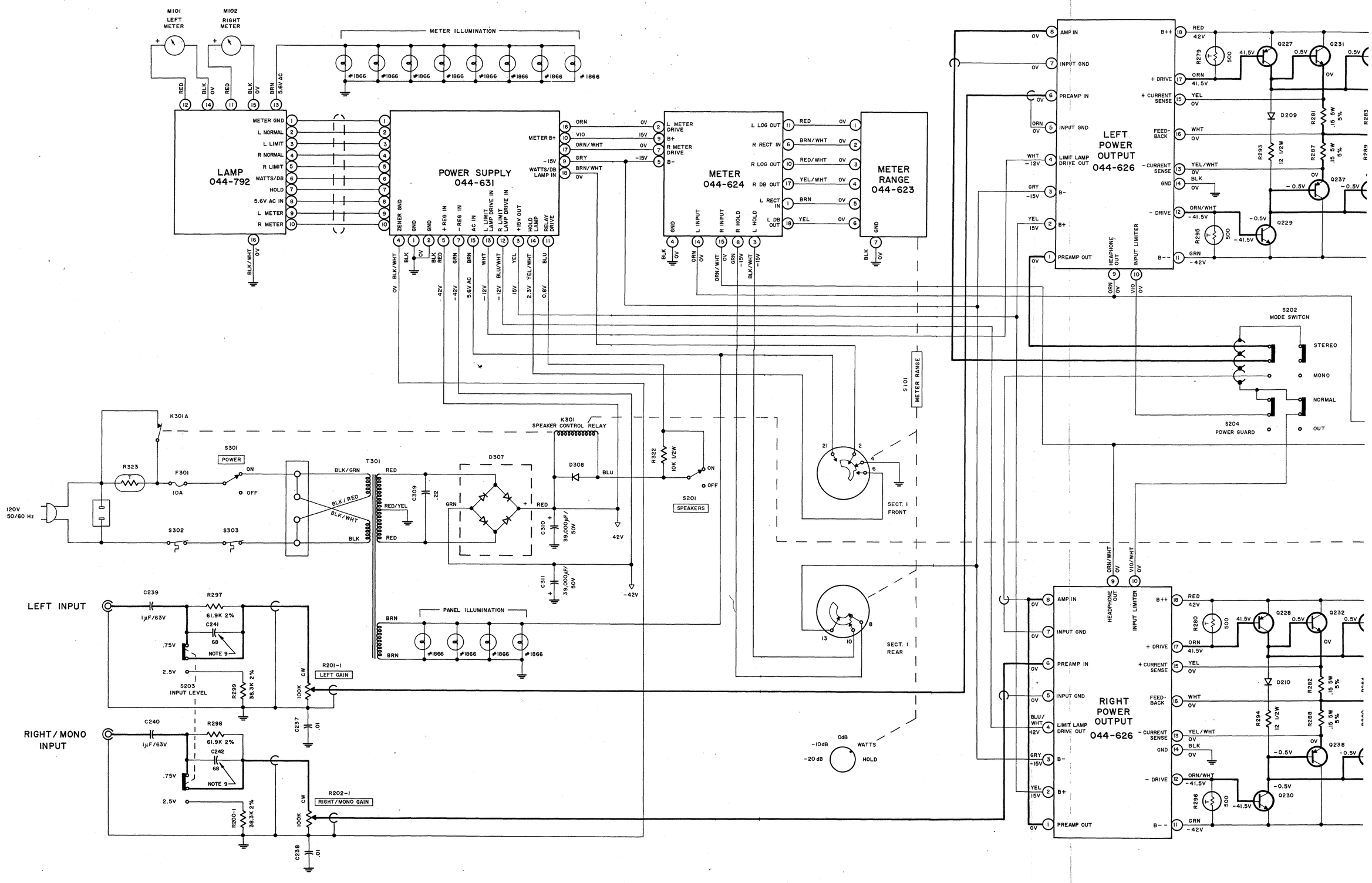

OUTPUT MODE LAMPS
LIMIT LAMP SEQUENCER
DISTORTION ANALYZER
DRIVER
OUTPUT STAGE
SENTRY MONITOR CURRENT LIMITER
LEFT INPUT
INPUT LEVEL SWITCH
LEFT GAIN CONTROL
ELECTRONIC ATTENUATOR
PREAMP
INPUT AMP
PRE-DRIVER
METER RANGE SWITCH
POWER GUARD SWITCH
FEEDBACK NETWORK
DRIVER
OUTPUT STAGE
SENTRY MONITOR CURRENT LIMITER
+15V REGULATOR
TURN ON/OFF TRANSIENT PROTECTOR
AC LINE
ON - OFF SWITCH
THERMAL SWITCH
INRUSH CURRENT LIMITER
POWER TRANSFORMER
POWER SUPPLY AND FILTER
+42V
-42V
MODE SWITCH
HEADPHONE MATCHING NETWORK
HEADPHONE OUTPUT
SPEAKER SWITCH
-15V REGULATOR
TURN ON/OFF TRANSIENT PROTECTOR
FEEDBACK NETWORK
FEEDBACK NETWORK
DRIVER
OUTPUT STAGE
SENTRY MONITOR CURRENT LIMITER
POWER GUARD SWITCH
METER RANGE SWITCH
RIGHT/MONO INPUT
INPUT LEVEL SWITCH
RIGHT/MONO GAIN CONTROL
ELECTRONIC ATTENUATOR
PREAMP
INPUT AMP
PRE-DRIVER
SENTRY MONITOR CURRENT LIMITER
DRIVER
OUTPUT STAGE
METER LAMPS
OUTPUT MODE LAMPS
LIMIT LAMP SEQUENCER
DISTORTION ANALYZER

OUTPUT MODE LAMPS
LIMIT LAMP SEQUENCER
DISTORTION ANALYZER
DRIVER
OUTPUT STAGE
SENTRY MONITOR CURRENT LIMITER
OUTPUT MONITOR METER
METER DRIVE
INPUT LEVEL SWITCH
LEFT GAIN CONTROL
ELECTRONIC ATTENUATOR
PREAMP
INPUT AMP
PRE-DRIVER
METER RANGE SWITCH
LOG AMP
FULL WAVE RECTIFIER
OVER SCALE LIMITER
SAMPLE AND HOLD
POWER GUARD SWITCH
FEEDBACK NETWORK
DRIVER
OUTPUT STAGE
SENTRY MONITOR CURRENT LIMITER
+15V REGULATOR
TURN ON/OFF TRANSIENT PROTECTOR
OUTPUT TRANSFORMER
8 Ω
4 Ω
2 Ω
1 Ω
COM
LEFT SPEAKER OUTPUT
THERMAL SWITCH
INRUSH CURRENT LIMITER
POWER TRANSFORMER
POWER SUPPLY AND FILTER
+42V
-42V
MODE SWITCH
HEADPHONE MATCHING NETWORK
HEADPHONE OUTPUT
SPEAKER SWITCH
-15V REGULATOR
FEEDBACK NETWORK
DRIVER
OUTPUT STAGE
TURN ON/OFF TRANSIENT PROTECTOR
OUTPUT TRANSFORMER
8 Ω
4 Ω
2 Ω
1 Ω
COM
RIGHT SPEAKER OUTPUT
POWER GUARD SWITCH
SENTRY MONITOR CURRENT LIMITER
INPUT LEVEL SWITCH
RIGHT/MONO GAIN CONTROL
ELECTRONIC ATTENUATOR
PREAMP
INPUT AMP
PRE-DRIVER
METER RANGE SWITCH
LOG AMP
FULL WAVE RECTIFIER
OVER SCALE LIMITER
SAMPLE AND HOLD
SENTRY MONITOR CURRENT LIMITER
OUTPUT MODE LAMPS
LIMIT LAMP SEQUENCER
DISTORTION ANALYZER
DRIVER
OUTPUT STAGE
METER LAMPS
OUTPUT MONITOR METER
METER DRIVE

BLOCK DIAGRAM

MC2205

MC2205



INTERCONNECTION

MC2205 MC2205

METER ILLUMINATION

#1866 #1866 #1866 #1866 #1866 #1866

POWER SUPPLY
044-631

METER B+
-15V WATTS/DB LAMP IN

METER
044-624

METER RANGE
044-623

S101 METER RANGE

LEFT POWER OUTPUT
044-626

RIGHT POWER OUTPUT
044-626

S202 MODE SWITCH
STEREO
MONO
NORMAL

S204 POWER GUARD
OUT

R203-1 220 5% 2W
R204-1 220 5% 2W

HEADPHONE

K301B

K301C

T201

T202

LEFT CHANNEL OUTPUT

RIGHT CHANNEL OUTPUT

8Ω 4Ω 2Ω 1Ω COM

K301 SPEAKER CONTROL RELAY

D307 D308

C309 .22
C310 39,000μF/50V
C311 39,000μF/50V

R322 10K 1/2W

S201 SPEAKERS
ON
OFF

SECT. 1 FRONT

SECT. 1 REAR

0dB
-10dB WATTS
-20dB HOLD

PANEL ILLUMINATION

#1866 #1866 #1866 #1866

METER SECTION PC BOARD 044-624

L LOG OUT 11 OV
L RECT IN 1 OV
B+ 9 15V
L INPUT 14 OV
L dB OUT 18 OV
R INPUT 15 OV
R dB OUT 17 OV
B- 5 -15V
GND 4 OV
13 OV
16 OV
R LOG OUT 10 OV
R RECT IN 6 OV
R HOLD 8 -15V
R METER DRIVE 7 OV
L METER DRIVE 2 OV
L HOLD 3 -15V

R107 330K 5%
D101
D103
C101 10µF NP
R101 6.2K 5%
IC 101
C103 33
-14.4V
-15V
D107
D105
R141 54K
R103 10K
R105 10K CW
DB ADJ.

IC 103
C105 150
D109
R111 470K
D113
C109 1.5µF
R119 3.3M 5%
R115 8.2K 5%
C111 .001
Q103
14.7V
Q101
C113 10µF/50V
R127 4.7K
R121 7.5K
R129 3.9K
R123 470
R125 500 CW
LOG ADJ

R109 8.2K 5%
IC 105
C107 150
D111
R113 470K
D115
R117 7.5K 5%

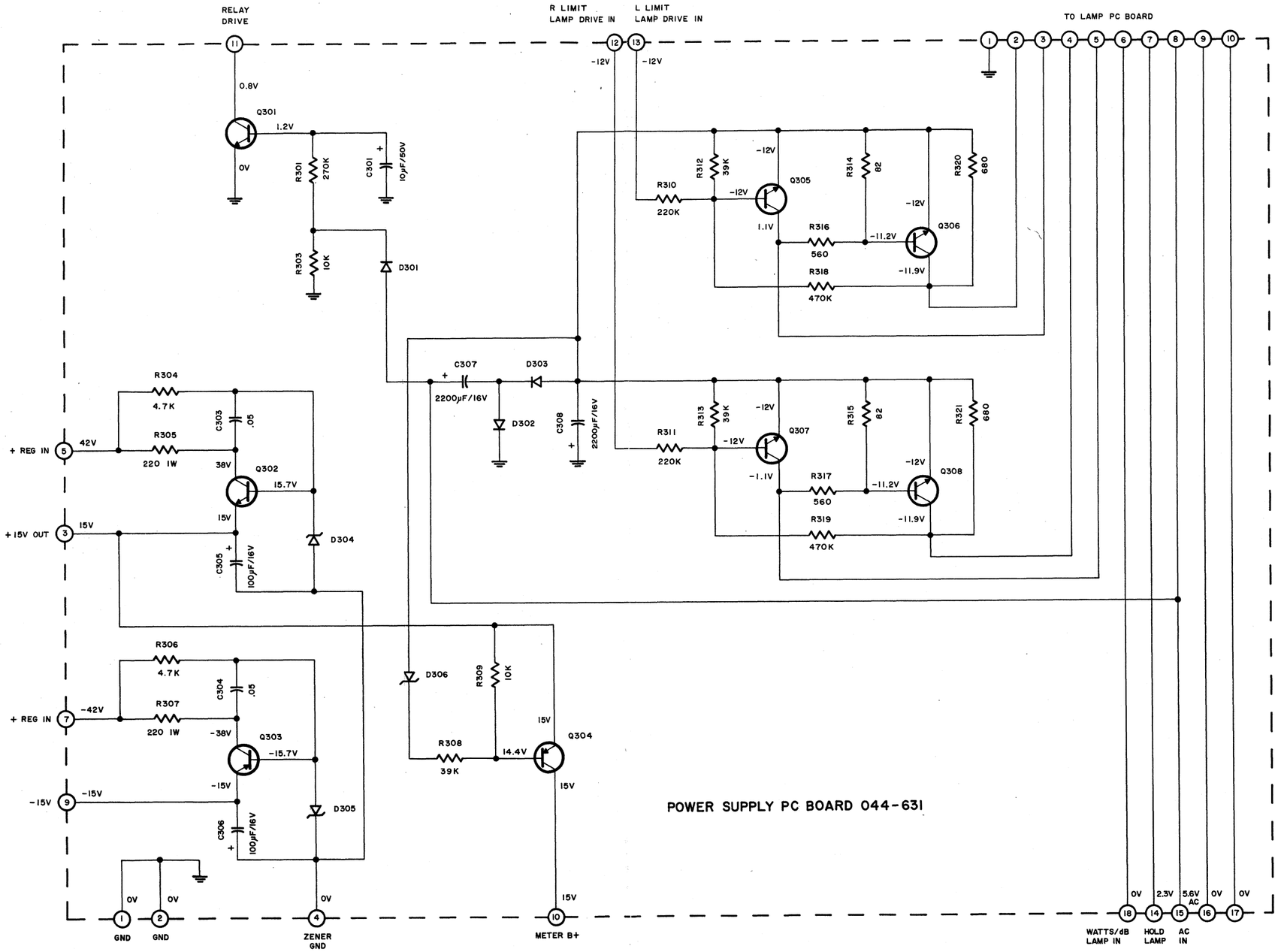
C116 .01
C117 .01
C118 47µF/16V

R108 330K 5%
D102
D104
C102 10µF NP
R102 6.2K 5%
IC 102
C104 33
D108
D107
R142 54K
R104 10K
R106 10K CW
DB ADJ.

IC 104
C106 150
D110
R112 470K
D114
C110 1.5µF
R120 3.3M 5%
R116 8.2K 5%
C112 .001
Q104
14.7V
Q102
C114 10µF/50V
R128 4.7K
R122 7.5K
R130 3.9K
R124 470
R126 500 CW
LOG ADJ

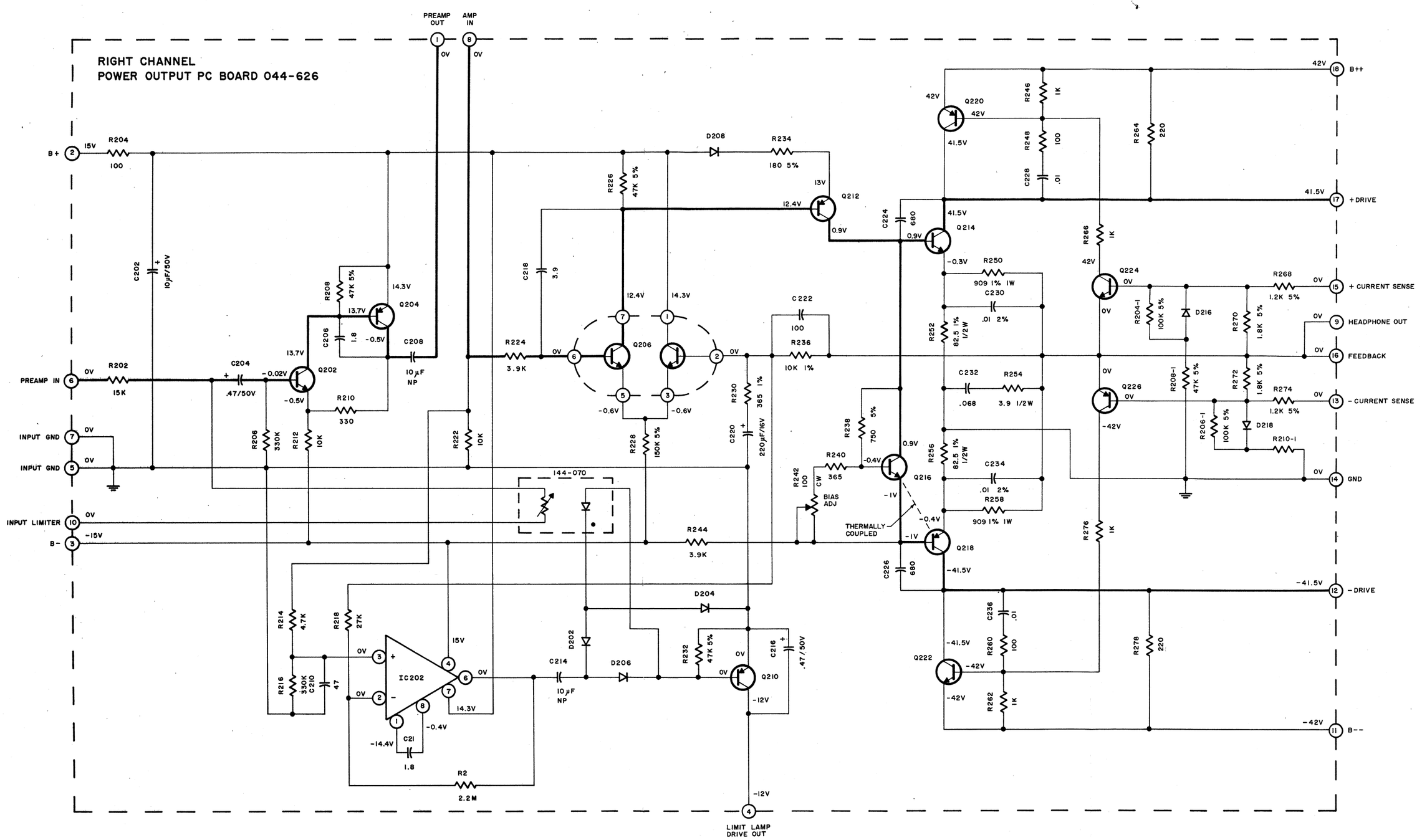
R110 8.2K 5%
IC 106
C108 150
D112
R114 470K
D116
D117
R118 7.5K 5%
C115 22µF/35V
R131 22K
R132 22K
Q105 6.2V
R133 470K
D118
D119

METER



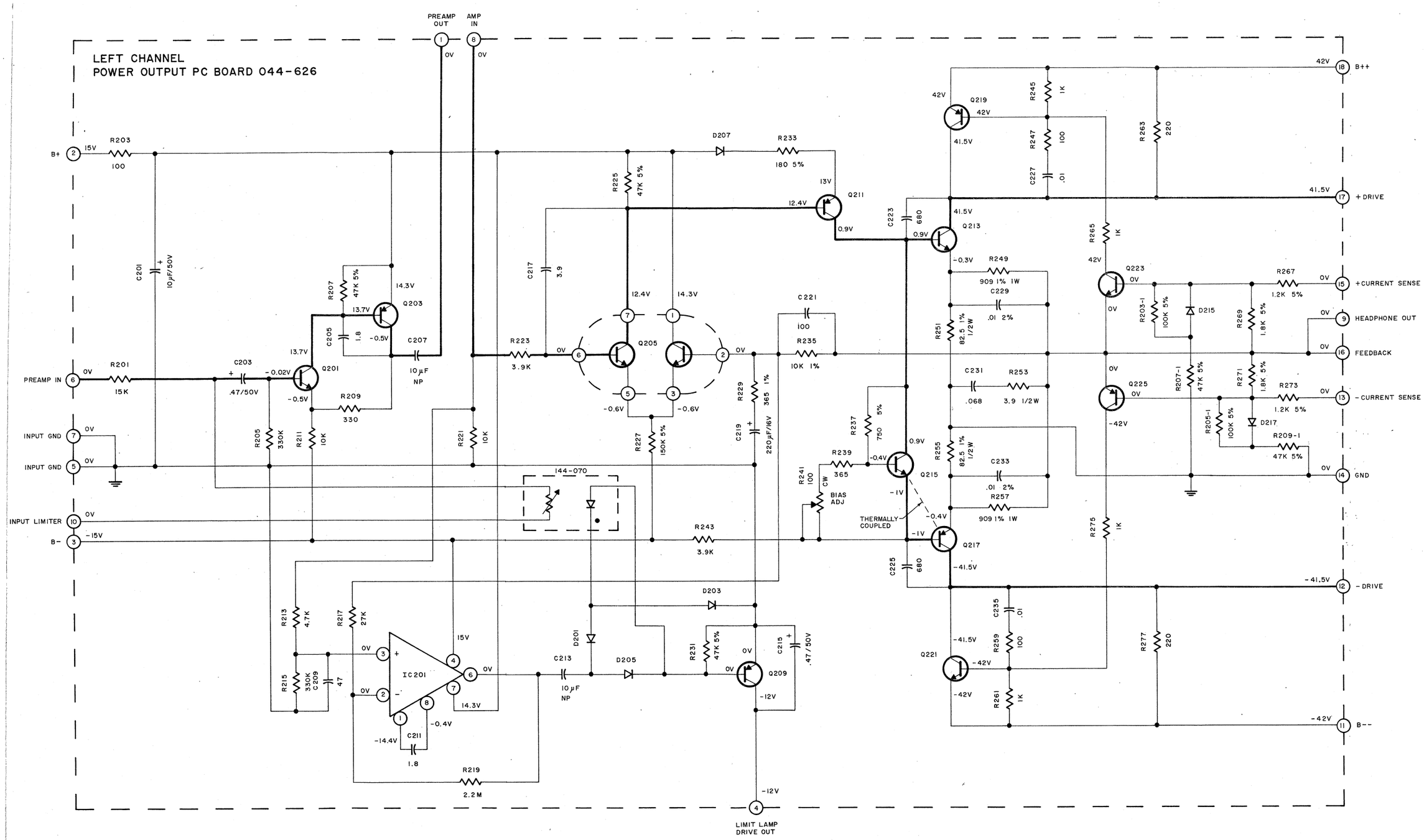
POWER SUPPLY PC BOARD 044-631

POWER SUPPLY



POWER OUTPUT

LEFT CHANNEL
POWER OUTPUT PC BOARD 044-626



POWER OUTPUT

Q241,242	Si. PNP transistor				132-165
Q301	Si. NPN transistor				132-090
Q302	Si. NPN transistor				132-078
Q303	Power transistor				132-079
Q304	Si. PNP transistor				132-096
Q305	Si. NPN transistor				132-090
Q306	Si. NPN transistor				132-143
Q307	Si. NPN transistor				132-090
Q308	Si. NPN transistor				132-143
	INTEGRATED CIRCUITS				
IC101,102	Integrated circuit				133-037
IC103,104	Integrated circuit				133-037
IC105,106	Integrated circuit				133-037
IC201,202	Integrated circuit				133-037
	POTENTIOMETERS				
R105,106	dB Adjust				134-294
R125,126	Log Adjust				134-293
R241,242	Bias Adjust				134-298
R201-1,202-1	Gain controls				134-273
	RESISTORS				
R135,136	Film	2.49K	2%	1/4W	144-049
R137,138	Film	649Ω	2%	1/4W	144-050
R139,140	Film	274Ω	2%	1/4W	144-048
R141,142	Thermistor				144-075
R229,230	Film	365Ω	1%	1/4W	144-071
R249,250	Film	909Ω	1%	1/4W	144-073
R251,252	Film	82.5Ω	1%	1/4W	144-072
R255,256	Film	82.5Ω	1%	1/4W	144-072
R257,258	Film	909Ω	1%	1/4W	144-073
R279,280	Thermistor				144-074
R281,282	Wirewound		.15Ω	5W	139-105
R283,284	Wirewound		.15Ω	5W	139-105
R285,286	Wirewound		.15Ω	5W	139-105
R287,288	Wirewound		.15Ω	5W	139-105
R289,290	Wirewound		.15Ω	5W	139-105
R291,292	Wirewound		.15Ω	5W	139-105
R295,296	Thermistor				144-074
R297,298	Film	61.9K	2%	1/4W	144-077
R299	Film	38.3K	2%	1/4W	144-076
R323	Thermistor				144-012
R200-1	Film	38.3K	2%	1/4W	144-076
R203-1,204-1	Wirewound		220Ω	2W	139-076

	SWITCHES	
S101	Meter range switch	146-180
S201	Power on-off switch	146-183
S301	Speaker switch	146-183
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